

An antibiotic resistance pattern in Isolates of *Escherichia coli* producing broad-spectrum β -lactamase from urinary tract infection in hospitals affiliated to Ardabil University of Medical Sciences against nitrofurantoin and phosphomycin

Abstract

Background and objective: Gram-negative bacilli are the most common cause of urinary tract infection and among them *E. coli* is responsible for 80% of infections. This bacterium is a natural habitat for human intestinal tract and is associated with many human infections. Related urinary tract infections associated with *Escherichia coli* producing broad-spectrum beta-lactamases are the main problem in many parts of the world. Increased multi - drug - resistance (MDRs) is commonly associated with a higher proportion of urinary tract infections, which reduces therapeutic options. antibiotic Resistant *Escherichia coli* (*E.coli*) is very important in hospitalized patients. The aim of this study was to evaluate the effect of phosphomycin and nitrofurantoin on broad-spectrum β -lactamase producing *Escherichia coli* isolated from urinary tract infections.

Methods: Samples included urine isolated from patients with urinary tract infection, urine specimens of patients were cultured on McCanky culture media and Eosin methylene blue and Muller hinton agar. Grown-up *E. coli* were cultured with differential microbiological biochemical tests including fermentation. The sugars were cultured in a TSI medium and disk oxidase and performed IMVIC tests. *Escherichia coli* drug resistance was determined by performing sensitization tests by standardized disk diffusion method using antibiotic disks including ceftazidime, cefotaxime, cefotaxime with clavulonic acid, nitrofurantoin, and phosphomycin. Ceftazidime discs, cefotaxime, cefotaxime with clavulonic acid, and ceftazidime with clavulonic acid show the presence of broad-spectrum beta-lactamases in all types of *Escherichia coli* with multiple drug resistance.

Results: In this study, 146 isolates of *Escherichia coli* were examined. Of which 40 (27.4%) were ESBL and 106 (72.6%) Non ESBL. Of the 40 cases of ESBL, 34 cases (85%) were sensitive, and 4 cases (10%) in interstitial status and others resistant to nitrofurantoin. Of the 40 cases of ESBL, 20 cases (50%) were sensitive and 13 cases (32.5%) in interstitial status and 7 (17.5%) cases resistant to phosphomycin. Of 106 non ESBL cases, 93 cases (87.7%) were sensitive and 8 cases (7.5%) in interstitial status and 5 cases (4.7%) resistant to nitrofurantoin. Of 106 cases, 61 cases (57.5%) were susceptible and 31 cases (29.2%) in interstitial conditions and 14 (13.2%) resistant to phosphomycin.

Conclusion: In the present study, it can be concluded that although both groups of ESBL and non-ESBL *Escherichia coli* were sensitive to both antibiotics of phosphomycin and nitrofurantoin, the sensitivity to nitrofurantoin was significantly higher than phosphomycin.

Keywords: Antibiotic resistance, *Escherichia coli*, Nitrofurantoin, Phosphomycin